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also the work of Platner (*Die Karyokinese bei den Lepidopteren als Grundlage für eine Theorie der Zelltheilung*. Internat. Monatschr. f. Anat. und Hist. III, 347-587, 2 pl., Leipzig, 1886), in showing that important steps in the perfecting for conjugation of male and female nuclei are identical. In short no difference of male and female can be discovered in the nuclear structure of male and female reproductive cells by any known method. This has lead to the oft repeated statement, "chromatin is not sexed." As the writer of this section might put it: ultimately male and female protoplasms are different only in past experiences, and such differences are not observable with a microscope.

At first thought such a case of male parthenogenesis as is brought to light by Boveri's experiments seems to invalidate all theories of sex which would make the male and female factors in reproduction fundamentally different; for example, the well-known theory of Dr. Brooks that the female is in general more conservative than the male while the male tends to vary more than the female. "If a perfect animal could be developed" says this author (*Heredity*, p. 102), "from the spermatozoon of a male parent, as it can be, in cases of parthenogenesis, from the ovum of a female parent, we should have a means of proving that each sex transmits its entire organization to its offspring." "The phenomena of parthenogenesis, or reproduction by virgin females, as in the case of bees and wasps, show that the ovum alone may transmit all the established hereditary structure of the species, but there is and can be no evidence that the male element can accomplish the same thing," (p. 125). It now appears that the spermatozoon is able to do what it seemed safe enough to assert to be impossible in the nature of the case. But it must be admitted that we should not resort to the stable and ancient *echinodermata* to study variation and especially any variations which may depend upon sexual differentiations. It may well be that the male has been specialized to function as a progressive or variable factor in some species and not in others. Such an experiment as Boveri's, however, seems to preclude the universality of a principle of this kind; and still this very experiment proves more than the equivalence of the male and female element; the male nucleus being able to build up its entire structure; while the female nucleus, accepting Whitman's theory of polar globules, is able to make only a feeble effort at segmentation. This would seem to indicate a prepotency in formative power on the part of the male nucleus, which may be confined to certain species or may be a general characteristic, hitherto not so clearly revealed, but present in all male reproductive nuclei.

The work of Boveri certainly opens a new line of experiment in this interesting field. The method must be applicable to other forms, and until more experiments of the kind are made, it is useless to attempt to reason further as to the general bearings of his discovery upon questions of heredity and sex.

C. F. H.

#### VI.—MISCELLANEOUS.

*Die naturwissenschaftlich-psychologische Weltauffassung der Gegenwart*, von Dr. HERMANN WOLFF, Dozent an der Universität Leipzig, 1890. (2 vols.)

Whatever criticism may be made of the work before us, it is certainly large in range; and as its title indicates, represents some of the most recent phases of philosophic and scientific thought. Zeller says, that through the great development of the sciences new questions arise for solution, new means are required, and a partial change from the former experience of philosophy is possible; and so it must enter into closer relation with the sciences. The recent investigations on the organs of sense and the brain make necessary a renewed proof of the psychological and

metaphysical foundations of idealism. Exclusive idealism must be supplemented by a healthy realism. Wundt says, that philosophy must take as its foundation the whole range of scientific experience; then it will be the science of sciences in the true sense of the word. Science has uncontestedly the ruling interest of the day; and with reason, because of the exactness of its method and the certainty of its results. But science at its zenith ends with unsolved problems. These limits are in the words of Du Bois-Reymond: (1) inertia, matter and force; (2) the inconceivability of a passage from the mental to the material; (3) the origin of motion; (4) the genesis of life; (5) the arrangement of the world according to a purpose; (6) the origin of rational thought, and of language; and (7) the problem of free will. And Haeckel rightly says, that these phenomena are not fully explained by heredity and selection. This lies in the fact that our knowing faculty is absolutely limited and has only a relative extension. It is conditioned above all, by the nature of our sense-organs and brain. Bunge in his treatise on physiological and pathological chemistry also says, that the mechanism of the present brings us with certainty to the vitalism of the future, but that the essence of this vitalism consists in a going out from the known, the inner world, to explain the unknown, the outer world. The above ideas are an acknowledgement from the side of science itself, that its continuation and completion must be found in philosophy. Science without philosophy ends in unsolved problems; philosophy without science lacks a sure foundation. Both are children of the same mother; both work for the solution of the same secrets. But in what philosophy shall science find its continuation and consummation? It is the very nature of science to rest on experience; and this philosophy therefore must be based on facts; in a word, purely empirical. With such a philosophy only, can science go hand in hand. Such a philosophy, the author says is set forth in this work. The foundation of ethics (treated of in the second volume) must come from the results of science and philosophy; the proof of truth must be derived from metaphysics (*sit venia verbo*). The moral act expresses the deepest nature of humanity, and is inseparably connected with the sense-phenomenal and psycho-metaphysical nature of man. Morality cosmologically considered brings to light the essence of man; and thus the investigation of moral problems leads to the study of anthropology, cosmology, psychology and metaphysics. In order that the whole may have a logical connection and a systematic unity, the author investigates in like manner the object as the methodological problem, the transcendental problem and the epistemological. He then considers the analysis of the Microcosmus, that is, of the individual man according to his physical and mental content, as expressed in the conscious *ego*. This is followed by an analysis of the Macrocosmus, both of the organic and inorganic part. Since here is shown how the being and functioning of the objective world is imaged again in scientific consciousness, this part also can be designated as a microcosmus in subjective relation with the first part as a microcosmus in objective relation. A unified system of philosophy with the name of "empirical psychical realism" will be, as Haeckel says, the philosophy of the future; and is nothing further than a complete system of monism.

*Les lois de l'imitation; Étude sociologique*, par G. TARDE. Paris, 1890. pp. 431.

In this work the author has endeavored with as much clearness as possible to bring out the purely social side of humanity; abstracting that which is simply vital or physical. But he finds, that the point of view, in favor of which he could mark this difference, shows between the social and natural phenomena the most numerous, constant and natural analogies. This pure sociology is general; its laws are applicable to all actual, past or possible societies, just as physiological laws